

Patent
Attorney's Docket No. 016660-082

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
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Vladimir Markovich KOZENKOV et al.) Group Art Unit: 1756
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Application No.: 09/853,648) Examiner: John A. McPherson
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Filed: May 14, 2001) Confirmation No.: 6482
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For: PHOTO-INDUCED DICHROIC)
POLARIZERS AND FABRICATION)
METHODS THEREOF)
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REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In complete response to the Office Action issued on July 16, 2003, reconsideration and allowance of the above-identified application are respectfully requested. Claims 1-13, 15, 17 and 18 remain pending.

Initially, Applicants note with appreciation the Examiner's indication that claims 13, 15, 17 and 18 are allowed. Applicants also note with appreciation the indication in paragraph 6 of the Office Action that claims 2 and 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in the manner described in that paragraph.

In the third paragraph of the Office Action claims 1, 3-5 and 9-12 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the article "Thin Photo-Patterned

Internal Polarizers for LCDs" by *Kozenkov et al.* ("*Kozenkov*"). This ground of rejection is respectfully traversed.

Kozenkov does not anticipate Applicants' claim 1 because *Kozenkov* does not disclose all the elements of Applicants' claim 1. For example, *Kozenkov* does not disclose the step of "forming a layer of a photochemically stable dichroic absorber on a substrate" as recited in Applicants' claim 1.

The citation of *Kozenkov* to reject Applicants' claim 1 appears to be based on the language in *Kozenkov* which uses similar wording to the claims of the present application. However, this similarity, for example "photo-chemically stable dyes" referred to in *Kozenkov* compared with "photochemically stable dichroic absorber" in claim 1, is superficial only and the underlying science in *Kozenkov* is very different from the Applicants' claimed invention. Accordingly, it is respectfully submitted that one of ordinary skill in the art would not have considered the photo-chemically stable dyes discussed in *Kozenkov* as anticipating the photochemically stable dichroic absorber recited in Applicants' claim 1. To assist in understanding the differences between *Kozenkov* and the presently claimed invention as explanation of the mechanism that can give rise to photo-induced optical anisotropy is provided. Traditionally, there are two types of photo-chemical mechanisms which can give rise to photo-induced optical anisotropy.

The first mechanism involves either an irreversible reaction such as photo-induced cross linking or photo-decomposition, or a reversible reaction and this is known as photo-chemical selection or the Weigert effect (see e.g. the attached article by S.G. Gloutier et al., J. Opt. A, 4, s228 (2002)). This is described in more detail by some of the present

inventors in the book "Optical Applications of Liquid Crystals", edited by L Vicari, Institute of Physics Publishing, Bristol and Philadelphia, 2003, pp.201-244, a copy of which is provided for the Examiner's reference. Anisotropic layers formed in this way are characterised by a small value of the order parameter (less than 0.4) and a corresponding low value of the induced optical dichroism. The dichroic spectra of these substances experiences a considerable change in its form during the UV light exposure.

A second mechanism is based on the reversible photo-chemical *trans-cis-trans* photo-isomerization of certain azo dyes (C. Jones, S. Day, Nature 351, 15 (1991), a copy of which is attached) with very high (more than 0.2) quantum efficiency of the photo-chemical reasons *trans cis and cis trans* (T.G. Pederson et al., J. Opt. Soc. Amer. 15, p.2726 and p.2729 (1998), a copy of which is attached). The anisotropic layers formed in this way can be characterized by a relatively high value of the order parameter and induced optical dichroism. *Kozenkov* refers to an example of such a mechanism involving the azo dye AD-1. The description of the azo dye AD-1 in *Koznekov* is referred to as being photo-chemically stable in the sense that the dichroic spectra of such a dye will only slightly change during the CV exposure. It is in this sense that the *Kozenkov* refers to dyes as being "photo-chemically stable".

In contrast the term "photochemically stable dichroic absorber" in claim 1 of the present of application refers to very different materials and methods for the fabrication of photo-induced dichroic polarizers. This method involves the use of dichroic absorbers (including azo-dyes) that have a very small quantum efficiency (less than 0.001) of the photo-chemical reaction and which are not involved in photo-chemical reactions (See, for

example, "Optical Applications of Liquid Crystals", ed. by Vicari, Institute of Physics Publishing, Bristol and Philadelphia, 2003, p.202, a copy of which is attached) and therefore may be termed "photo-chemically stable". The absorption process results in a final order state with minimum absorption in the polarization direction of the activated light and maximum absorption in the corresponding perpendicular direction.

It is respectfully submitted that one of ordinary skill in the art would not have considered what is described as a photo-chemically stable dye in *Kozenkov* as anticipating the "photochemically stable dichroic absorber" recited in Applicants' claim 1. MPEP §2111.01, citing *In re Zletz*, 893F.2d 319, 321, 13 U.S.P.Q.2d 1320, 1322 (Fed. Cir. 1989), states that "[d]uring examination, the claims must be interpreted as broadly as their terms reasonably allow. This mean that the words of the claim must be given their plain meaning unless Applicant has provided a clear definition in the specification." The present application, at page 5, defines the term "photochemically stable molecules" as "molecules that are no longer involved in the irreversible or reversible photo chemical reaction. In the solid phase, in such cases the quantum efficiency associated with the photo chemical reaction is about 10^{-8} - 0.1." It is respectfully submitted that one of ordinary skill in the art reading Applicants' specification would understand that these photochemically stable molecules are comprised in a photochemically stable dichroic absorber as recited in Applicants' claim 1. Because the photochemically stable dye described in *Kozenkov* is not the same as that recited in Applicants' claim 1, when interpreted with the definition provided in Applicants' specification, *Kozenkov* cannot anticipate Applicants' claim 1.

Claims 3-5 and 9-12 variously depend from Applicants' claim 1, and hence, *Kozenkov* does not anticipate these claims for at least those reasons stated above with regard to Applicants' claim 1.

For at least those reasons stated above it is respectfully requested that the rejection of claims 1, 3-5 and 9-12 as allegedly being anticipated by *Kozenkov* be withdrawn.

All outstanding objections and rejections having been addressed, it is respectfully submitted that the present application is in immediate condition for allowance. Notice to this effect is earnestly solicited. If there are any questions regarding this response, or the application in general, the Examiner is encouraged to contact the undersigned at 703-838-6578.

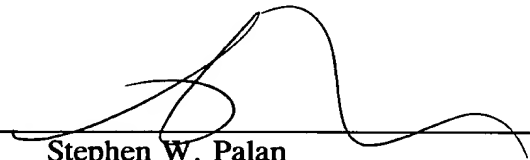
Respectfully submitted,

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11/14/03

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